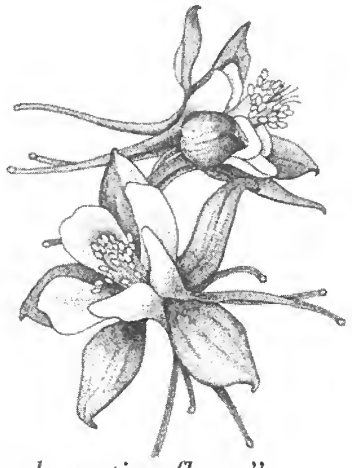
Aquilegia

Newsletter of the Colorado Native Plant Society



". . . dedicated to the appreciation and conservation of the Colorado native flora"

Updated generic keys of Poaceae for the Southern Rocky Mountain Region Part 1: *Bromus* L.

by Neil Snow

Newly published floras typically include some level of splitting and lumping at the generic and specific levels compared to existing regional treatments. Volumes 24 and 25 treating the grass family (Poaceae) in *Flora of North America* are no exception compared to recent floras for Colorado (Weber and Wittmann 1992, 2000), Wyoming (Dorn 2001) and New Mexico (Martin and Hutchins 1981).

The ongoing development of an interactive key to Poaceae for the Southern Rocky Mountain Interactive Flora (Snow, in prep.), based on the recently released *Checklist of Vascular Plants of the Southern Rocky Mountain Region* (Snow 2007), required reviewing taxonomic concepts for several widespread and ecologically important genera in our region. This article presents the first in a series of articles to *Aquilegia* providing updated keys to these important genera (see Snow 2007 for details and nomenclatural authorities).

Nearly all herbarium specimens of *Bromus* at the University of Northern Colorado herbarium were re-keyed in 2007 using taxonomic concepts based primarily on the treatment in Volume 24 of *Flora of North America* (Pavlick and Anderton 2007) and Peterson et al. (2001). In the key below, all measurements refer to lengths; lemmatal lengths refer to the lowermost lemma. Included in the keys are some taxa whose ranges closely approach ours and whose presence likely will soon be found in our area. In most cases the relevant infraspecific taxa are also included in the keys. Some taxa will fall out of their generic key in more than one place. Users should consult treatments in *FNA* for additional details, and are encouraged to relay information to me for consideration in development of the interactive key.

Taxonomic changes for *Bromus* in our region compared to many previous treatments include: 1) Many specimens identifiable previously in our region as *Bromus anomalous* are now properly placed under *B. porteri*, since *B. anomalous* is now considered to be restricted to west Texas; 2) *B. canadensis* is now synonymized under *B. ciliatus*; and 3) *B. pumpellianus* has been raised to specific level from varietal level under *B. inermis*. Species of *Bromus* relatively new for our region include the weedy annual species *B. diandrus*, *B. rubens*, *B. sterilis*, although none have been collected frequently. For the genus *Bromus*, leads 21 and 22 must be read carefully and all of the information considered. (I recently posted a newer "version 2" Checklist on the CoNPS website, which has minor updates for *Bromus*.)

"*Bromus* " continues on page 2

Contents

Key to species of *Bromus*

1. Spikelets strongly compressed laterally; lemmas strongly keeled distally; lower glumes 3--7(9) veined (Sect. Ceratochloa).....
1. Spikelets round to only moderately compressed; lemmas rounded over midvein; lower glumes 1--5-veined.....4
    2. Lemmas unawned or awned, veins 9--13, veins often raised distally or throughout.....***B. catharticus*** Vahl
    2. Lemmas awned.....3
3. Lemma and/or throat of sheath hairy.....***B. carinatus*** Hook. & Arn.
3. Lemma and throat of sheath (i.e. near apex) glabrous.....***B. polyanthus*** Scribn.
    4. Lemmatal awn, if present, arising more than 1.5 mm beneath lemma apex; lemma apex entire, emarginate, or with teeth more than 5 mm long.....5
    4. Lemmatal awn, if present, arising less than 1.5 mm beneath lemma apex; lemma apex entire, emarginate, or with teeth less than 1 mm long. (Sects. *Bromopsis* and *Bromus* [in part]).....11
5. Lower glumes 3--5 veined; upper glumes 5--9 veined; spikelets with parallel or converging sides in outline; glume margins often not hyaline (transparent) (Sect. Bromus, in part).....6
5. Lower glumes 1--3 veined; upper glumes 3--5 veined; spikelets with parallel or diverging sides in outline; glume margins hyaline (Sect. Genea).....8
    6. Panicle branches shorter than the spikelets; lemma with prominently raised ribs over the veins; glumes glabrous to pilose; anthers 0.6--1.5 mm.....***B. hordeaceus*** L.
    6. Panicle branches (at least some) longer than the spikelets; lemma veins typically distinct but not prominently raised; glumes glabrous, scabrous, or pubescent but never pilose; anthers 0.7--5 mm.....7
7. Lemmas 8--11.5 mm; margins bluntly angled; anthers 0.7--1.7 mm; rachilla internodes 1.5--2 mm long.....***B. commutatus*** Schrad (in part)
7. Lemmas 6.5--8 mm; margins rounded; anthers 1.5--3 mm; rachilla internodes 1--1.5 mm long.....***B. racemosus*** L
    8 (5). Lemmas greater than 20 mm.....***B. diandrus*** L.
    8. Lemmas shorter than 20 mm.....9
9. Spikelets longer than the panicle branches; panicle branches erect to spreading but never drooping.....***B. rubens*** L.
9. Spikelets usually shorter than the panicle branches; panicle branches ascending to spreading or drooping.....10
    10. Lemmas 12 mm or less; panicles with drooping branches, oftenwith1 or more branches with 4--8 spikelets...***B. tectorum*** L.
    10. Lemmas 14 mm of more; panicles with spreading, ascending, or drooping branches, rarely with any branches with more than 3 spikelets.....***B. sterilis*** L.
11 (4). Lower glumes 1--3 veined; upper glumes 3--5 veined; plants perennial or annual (if annual then the lower glumes 1-veined and upper glumes 3-veined) (Sect. *Bromopsis*).....12
11. Lower glumes 3--5 veined; upper glumes 5--9-veined; plants annual or biennial (if biennial then the upper glumes 7-veined and/or the lateral veins of the lemmas prominently ribbed) (Sect. *Bromus*).....23
    12. Plants rhizomatous.....13
    12. Plants cespitose, lacking rhizomatous.....14
13. Lemma sparsely to densely hairy throughout, or at least on the lower portion and margins or marginal veins and keel; lemmatal awns usually present, up to 7.5 mm.....***B. pumpellianus*** Scribn.
13. Lemma usually glabrous, or sparsely hairy at the base on sometimes the margins; awns absent or only to 3 mm.....***B. inermis*** Leyss.
    14. Collars and throats densely pilose.....***B. latiglumis*** (Scribn. ex Shear) Hitchc.
    (to be expected in Goshen and Niobrara counties in WY, westward from NE)
    14. Collars and throats glabrous or pubescent, but not densely pilose.....15

15. Most lower glumes within a given panicle 3-veined (sometimes 1-veined).....16
15. Most lower glumes within a given panicle 1-veined (sometimes 3-veined).....17
16. Leaf blades often glaucous; glumes usually glabrous (rarely slightly pubescent).....***B. frondosus*** (Shear) Wooton & Standl.
16. Leaf blades not glaucous; glumes usually pubescent (rarely glabrous).....***B. porteri*** (J.M.Coult.) Nash (in part)
17. Upper glumes emucronate.....***B. mucroglumis*** Wagnon
17. Upper glumes emucorante.....18
18. Glumes usually pubescent (sometimes shortly and sparsely so) or rarely glabrous.....19
18. Glumes usually glabrous or rarely pubescent.....21
19. Panicle branches appressed to only slightly spreading.....***B. erectus*** Huds.
19. Panicle branches ascending to drooping.....20
20. Lower glumes usually 3-veined or sometimes 1-veined, 4--8 mm; lemmatal awns 1--3.5 mm; anthers (1) 2--3 mm; blades 2--6 mm wide.....***B. porteri*** (in part)
20. Lower glumes 1-veined, 5--7(9)mm; lemmatal awns 3--8 mm long; anthers 2--4 (5) mm; blades 3--19 mm wide.....***B. pubescens*** Muhl. ex Willd.
21. Internodes puberulent near the nodes (especially younger culms); lemma margins and backs usually pubescent (sometimes nearly glabrous); lemmatal awns 2--4 mm; anthers 1.8--4 mm; upper glumes (6) 7--9 mm; upper glumes (6) 7--9 mm.....***B. lanatipes*** (shear) Rydb.
21. Internodes glabrous at and near the nodes; lemma margins and backs conspicuously hirsute or densely pilose at least near base, the backs glabrous at least on the lower lemmas; lemmatal awns 3--5 mm; anthers 1--2.7 mm; upper glumes 7.1--11.3 mm.....22
22. Lemmas usually only ciliate along margins; anthers 0.9--1.6 mm long; upper glumes (6.2) 7.1--8.5(9.5) mm long; basal sheaths glabrous or with long hairs; upper culm blades hairy above; upper culm nodes usually hairy; caryopsis (5.4) 6.2--7.2 (7.5) mm long.....***B. ciliatus*** L.
22. Lemmas ciliate along margins and with scattered hairs on the lower half between margins and midnerve; anthers (1.2) 1.6--2.7 (3.4) mm long; upper glumes (7.8) 8.9--11.3 (13.2) mm long; basal sheaths with dense, short to medium-length hairs; upper culm blades glabrous above; upper culm nodes usually glabrous; caryopsis (6.9) 7.7--9.7 (10.5) mm long.....***B. richardsonii*** Link
23 (11) Lemmas inflated, 6--8 mm wide; awnless or mucronate; spikelets ovate.....***B. briziformis*** Fisch. & C.A. Mey.
23. Lemmas not inflated, 1--7 mm wide; awns 2 mm or longer (rarely absent); spikelet shape various.....24
24. Lemmatal awns more or less straight and not twisted somewhat above base, margins inrolled at maturity; rachilla internodes and floret bases visible at maturity; lower leaf sheaths glabrous to moderately hairy.....25
24. Lemmatal awns divergent and frequently twisted somewhat above base, margins more or less flat at maturity; rachilla internodes and floret bases concealed at maturity; lower leaf sheaths mostly densely pilose.....26
25. Lower leaf sheaths glabrous to moderately hairy; lemmas 6.5--8.5 (10) mm, margins evenly rounded, awns straight or flexuous.....***B. secalinus*** L.
25. Lower leaf sheaths densely hairy; lemmas 8--11.5 mm, margins bluntly angled, awns straight.....***B. commutatus*** (in part)
26. Panicle branches usually with one spikelet, not drooping or sinuous; hyaline (transparent area) margin of lemma 0.6--0.9 mm wide.....***B. squarrosus*** L.
26. Panicle branches often with more than one spikelet, drooping and sometimes sinuous; hyaline margin of lemma 0.3--0.6 mm wide.....***B. japonicus*** Thunb. ex Murray

ACKNOWLEDGEMENT

Summer support for the author in 2007 to work on Poaceae came from National Science Foundation Grant DBI-0237149.

Neil Snow is out-going curator of the herbarium at the University of Northern Colorado (GREE), School of Biological Sciences, University of Northern Colorado Greeley. He can be contacted after 1 January 2008 at the Bishop Museum at neils@bishopmuseum.org.

"**Bromus**" continues on page 4

"**Bromus**" continued from page 3

LITERATURE CITED

Dorn, R. D. 2001. *Vascular Plants of Wyoming*, Ed. 3. Mountain West Publishing, Cheyenne.

Martin, W. C. and C. R. Hutchins. 1981. *A Flora of New Mexico*. Vols. 1 & 2. Baduz, West Germany, J. Cramer.

Pavlick, L. E. and L. K. Anderton. 2007. 12.01. *Bromus* L. Pp. 193-237, In: *Flora of North America*, Vol. 24: Magnoliophyta: Commelinidae (in part): Poaceae, part 1. M. E. Barkworth, K. M. Capels, S. Long, L. K. Anderton, and M. B. Piep, (Eds.). Oxford University Press: New York and Oxford.

Peterson, P. M., J. Cayouette, Y. S. N. Fernandez, B. Coulman, and R. E. Chapman. 2001. Recognition of *Bromus richardsonii* and *B. ciliatus*: Evidence from morphology, cytology, and DNA fingerprinting (Poaceae: Bromeae). *Aliso* 20: 21-36.

Snow, N. October 2007. *Checklist of Vascular Plants of the Southern Rocky Mountain Region*. Version 2. On-line at: (www.conps.org/plant_lists.html)

Weber, W. A. and R. A. Wittmann. 1992. *Catalog of the Colorado Flora: A Biodiversity Baseline*. University Press of Colorado, Niwot.

-----, -----. 2000. *Catalog of the Colorado Flora*. Revised electronic version. http://cumuseum.colorado.edu/Research/Botany/Databases/catalog.html).

Bromus squarrosus

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 1: 279.

WHO'S IN THAT NAME?

David Douglas
(1799-1834)
Intrepid Botanizer

by Al Schneider

Photo Courtesy of Hunt Institute for Botanical Documenta-

Few botanists have shined so brightly and had their light extinguished so quickly as David Douglas. He was born in 1799 to a poor Scottish family and attended school until he was eleven, walking a twelve mile round trip daily. His schooling may not have prepared him for the intellectual side of botanizing, but his walking certainly prepared him for the physical side of a field botanist, a position he embraced with such vigor and success that he became a British national hero.

After leaving school Douglas became a gardener's assistant and rose steadily and quickly in the estimation of all he worked with until in 1820 he was hired by the Glasgow Botanic Garden t work under William Hooker. In 1823 Hooker recommended him to the Royal Horticultural Society and the Society sponsored Douglas for his first trip to North America.

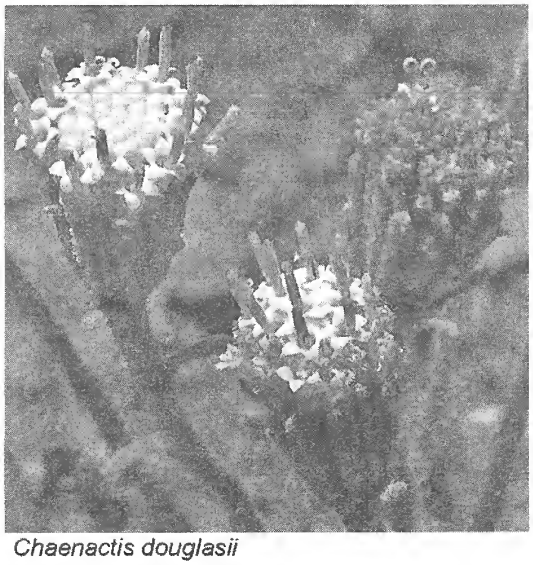
During his six months there he met John Torrey and Thomas Nuttall, examined some of Meriwether Lewis' specimens, and collected extensively in the eastern United States and Canada. The Society report of his travels stated that the "mission was executed by Mr. Douglas with a success beyond our expectations."

He was quickly engaged again by the Royal Horticultural Society and The Hudson Bay Company and he left for the Northwest coast of North America in 1824. From 1825 through 1827 he traveled thousands of miles by foot, horse, and canoe: from April to December of 1825 he traveled 2,100 miles, in 1826 he traveled 4,000 miles. in 1827 he left the coast and traveled 3,000 miles to the Hudson Bay, and from there sailed home. (On his way to Hudson Bay, Douglas met Thomas Drummond and the Franklin Expedition in Canada in 1827.)

Through these years and thousands of miles, Douglas was an intrepid botanizer, searching, climbing, crawling, digging, collecting, studying, pressing, and drying and re-drying after soak-

ing rivers and rains. His miles of travel in 1825-1827 took him -- often only in the company of an Indian guide/interpreter -- up the Columbia, back to the coast, to California, back to British Columbia, up the Columbia River to the Rockies, and back to the coast. He was almost always in areas no Westerner had ever been. He was wrecked in canoes, thrown into a river by his horse, lost collections and went back for more, slogged through deep snows to reach alpine plants, slept many nights with no shelter, faced Indian hostilities a number of times, was next to starvation, but he continued to collect and collect. The months on end of living in wilderness, said Douglas, were "looked upon by me [at first] with a sort of dread. Now I am well accustomed to it so much that comfort seems superfluity." (From Lemmon: See end of this biography.)

Douglas brought large collections of plants and seeds home with him from this trip, but he had also shipped many extensive collections home over the years from the Pacific coast. When he arrived in England his reputation was already established and he was treated as a hero. He was only 28 but was elected Fellow of the Linnean, Geological, and Zoological Societies -- quite an honor for a Scottish poor boy gardener.

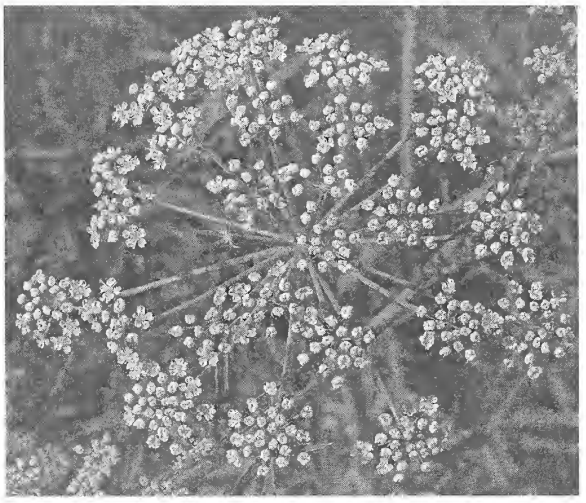


Chaenactis douglasii
Photo by Al Schneider

He returned to the Pacific coast in 1829, again under Hudson Bay patronage, spent several years botanizing up the Columbia, southward into California, to Hawaii, back to Fort Vancouver and the Columbia area, and then again to Hawaii in 1833. He loved Hawaii, climbing its volcanoes, scorching his feet, and collecting plants. On July 12th, 1834 he set off with his terrier to explore Mauna Loa, one of the two huge volcanoes on the Island of Hawaii. Douglas never returned from this trip: he fell into a pit (an animal trap) and was trampled to death by a steer that had previously fallen in. We don't know how the accident happened, but we do know that Douglas' eyesight had been damaged on his snowy expeditions and it is quite possible that he did not see the pit that cost him his life -- or perhaps he saw the pit and slipped in when he curiously looked into it.

From his travels, Douglas introduced to Britain over two hundred plants (including many pines and firs) that were widely planted as ornamentals and plantation crop trees. Douglas described, among many other plants, the ponderosa pine, the sugar pine with its enormous cones, the Sitka spruce, and the coastal redwoods. His collections formed the bases of several seminal botanical works including Hooker's *Flora Boreali-Americana*. Many Colorado plants bear Douglas' name.

For an enlightening, intriguing, eye-opening, mind-boggling view into the complexities and vagaries of the naming of plants, see James Reveal's excellent discussion of "Douglas fir" on the Lewis and Clark web site, http://www.lewis-clark.org/content/content-channel.asp?ChannelID=163.



Cicutata douglasii
Photo by Al Schneider

For the riveting story of Douglas and other explorers in Britain's worldwide quest for plants from 1768-1836, see Kenneth Lemon's The Golden Age of Plant Hunters. Chapter after chapter is filled with calamity, success, death, heroism, and surprises: Captain Cook was leading expeditions that had as a primary goal – botanizing. Botany Bay was named by Joseph Banks on a Cook expedition. Captain Bligh's voyage on the Bounty met with catastrophe in large part because of the rigors of botanizing. From China to Tahiti to California to Brazil to Africa and India, the British were around the world collecting plants for their gardens and meals. During the reign of King George III (1761-1820) it is estimated that nearly 7,000 new species were brought to England from around the world. Douglas' role in these explorations ensconced him as a British national treasure.

Al Schneider is CONPS webmaster and has generously taken the time to write our 'Who's in that Name?' Column. He can be reached at webmaster@conps.org.

CONSERVATION CORNER

Demographic Monitoring

by Jennifer Ramp Neale

The research staff at Denver Botanic Gardens (DBG) in collaboration with the Bureau of Land Management (BLM) has been monitoring several of Colorado's most rare and sensitive plants for well over a decade. Through this work land managers, specifically the BLM, receive data that aids in the evaluation of landscape level management.

What is demographic monitoring? Demography is the statistical study of populations (plants in this case). So, demographic monitoring is the collection and analysis of repeated observations to evaluate changes in population condition. What does this mean exactly? It means that each year, DBG and BLM research staff visit the same populations of target species and measure several characteristics such as: number of individuals, whether or not individuals have flowered, if they have produced fruit, and if they have been damaged by herbivores (insect or mammal). These observations are conducted over many years in order to track population change over time.

Why is demographic monitoring important and how are these data used? Monitoring can help land management agencies such as the BLM determine if current management practice is effective in protecting the species of concern. Monitoring is often conducted in order to detect a significant decline in the population over a given period of time (for example five years). If a decline is detected, management may need to change in order to prevent further decrease of the species.

In addition to detecting population declines, monitoring allows for a better understanding of true trends within populations whereas data from a single year (or even a short term study) may be influenced by climate (drought) or stochastic changes (fire), which are not representative of long-term trends or stability in the populations. By collecting data over several years we can identify normal fluctuations within populations as opposed to changes associated with other factors, such as habitat loss, prolonged drought, human pressures etc.

Denver Botanic Gardens and Bureau of Land Management staff have collaboratively monitored more than a dozen species since 1992. We have been tracking a few species for more than 13 years! The species chosen for monitoring are those considered to be rare or sensitive by various agencies. The main objective of our monitoring is to determine if populations are decreasing in size over time.

One species we have been tracking for 14 years is the skiff milkvetch (*Astragalus microcymbus* Barneby). The skiff milkvetch is found only in the Beaver Creek drainage outside of Gunnison Colorado with fewer than 50 known populations. Each year, we visit four sites within the drainage. Over the years, we have seen considerable decreases in population size. Several factors may contribute to these decreases. The area has experienced moderate drought over the last several years, which may influence rate of reproduction. In addition, we have observed considerable browsing by mammals (presumably rabbits), which may also influence reproductive rates. We have established mammal exclosures at the sites to determine if fencing populations will increase reproduction that may then help them persist over the long-term.

Another species monitored by DBG and BLM staff is the rare thistle *Cirsium ownbeyi* Welsh, Ownbey's thistle. Ownbey's thistle is known to be utilized by a biocontrol weevil released to control the invasive musk thistle *Carduus nutans* L. We conducted eight years of observations in an Ownbey's thistle population to determine the level of feeding by the biocontrol, and how use affected thistle population size over time. We detected minimal use of the thistle by the biocontrol, but overall population size was unaffected by this use indicating that the biocontrol is not having a negative affect on the thistle.

Additional monitoring conducted by DBG tracks several orchid species throughout the state of Colorado. This monitoring is done by volunteers involved in our Partners for Colorado Native Plants (PCNP) program. With the hard work of these volunteers, we are able to make sure that several rare orchid populations are healthy and undisturbed by human pressures from one year to the next.

Currently there are far more species in need of monitoring than we at DBG can possibly visit in a field season. We have joined forces with the Colorado Natural Areas Program in order to extend our reach and ability to train volunteers in the methodology of monitoring by establishing the Rare Plant Monitoring Steward Program. If you are interested in being involved in the monitoring and protection of some of Colorado's most rare species, please contact us to join either our PCNP orchid monitoring or RPM Steward Programs.

Jennifer Neale is the Manager of Research Programs at the Denver Botanic Gardens.

Who's on Board?!

by Leo Bruederle

Congratulations to Brian Kurzel and Jennifer Ramp Neale, who were elected recently to three-year terms (2007-2010) on the Board of Directors. Thanks very much to outgoing Directors Dick Fisher and John Proctor.

Brian Kurzel is currently the Coordinator and Ecologist for the Colorado Natural Areas Program, as well as a forest ecology advisor for Colorado State Parks. His expertise is in forest ecology and rare plants, but he also dabbles heavily in land management issues, volunteer management, and outreach for the Natural Areas Program. Brian received his Bachelors of Science at Cornell University in Ithaca, NY, and a Masters in Biogeography from the University of Colorado at Boulder, after completing a thesis on aspen forests in western Colorado. He has spent several years as an environmental educator and naturalist, and enjoys interpreting the natural world to get people excited about science and conservation.

Born and raised in Boulder, Jenny Neale received a B.S. in Biology from Rhodes College in Memphis, and subsequently attended the University of Colorado at Boulder, where she received her Doctorate in Ecology and Evolutionary Biology. Her dissertation work addressed "Restoration genetics and pollination of the rare vernal pool endemic *Lasthenia conjugens* (Asteraceae)." Jenny is currently Manager of Conservation and Research at the Denver Botanic Gardens, where she is involved in rare and native plant research, including long-term demographic monitoring and seed collection for ex-situ conservation. She is planning to expand existing DBG projects to include genetic and pollination components.

With the annual election of Directors comes the election of Society officers. As such, congratulations are due incoming Co-Presidents Jan and Charlie Turner, Vice President Al Schneider, and Corresponding Secretary Kim Regier. The Board recently agreed to create an additional Vice President, who would serve solely as President Elect. Congratulations to Boyce Drummond, who will serve in that capacity. We also thank Denise Culver and Denise Wilson for continuing in their roles as Treasurer and Recording Secretary, respectively.

Lasthenia conjugens
Mark W. Skinner@USDA-NRCS PLANTS Database

Become a Colorado Native Plant Master

Is that wildflower useful for landscaping? Learning which native plants are suitable for landscaping is just one of the skills that participants learn in the Native Plant Master™ program, sponsored by Colorado State University Extension. The field-based courses are held on local open space parks and other public and private lands in various counties across Colorado. Courses focus on plant identification, ecology, ethnobotany, landscaping and other human uses. Courses include use of a botanical key with an emphasis on scientific names and families.

Registration is limited. Applications are due for all county programs by March 15, 2008. There is a reasonable fee for each course and each course consists of three, four-hour sessions. The cost is reduced for participants who agree to teach at least 20 people per year per course about Colorado plants. Participants who pass three courses and satisfy the teaching requirement become certified Native Plant Masters.

For more information, visit http://jeffcoextension.org or contact the local Colorado State University Extension office in the following counties directly: (303) 678-6238 (Boulder County); (970) 328-8630 (Eagle and Garfield Counties); (303) 271-6646 (Jefferson and Gilpin Counties); (970) 498-6000 (Larimer County); (970) 522-3200 (Logan, Morgan, Washington, Kit Carson, Yuma, Phillips and Sedgwick Counties); (970) 244-1836 (Mesa County); (970) 565-3123 (Montezuma, Dolores, and La Plata Counties); (719) 583-6566 (Pueblo County); and (970) 327-4393 (San Miguel and W. Montrose counties).

Colorado State University Extension provides unbiased, research-based information about horticulture, natural resources, gardening, 4-H youth development and family and consumer issues. As part of a nation-wide system, Extension brings the research and resources of the University to the community.

Contact: Michelle Cederborg, Colorado State University Extension, ,(303) 271-6646, mcederbo@jeffco.us

BOOK REVIEW

by Jan Loechell Turner

Wildflowers of Colorado Field Guide. 2007. Don Mammoser with Stan Tekiela. Cambridge, MN: Adventure Publications. $16.95.

The past few years have seen the publication of a large selection of wildflower guides focusing on all, or specific areas, of the state of Colorado and the Rocky Mountain west. Each guide offers new information for those with an interest in botany. These picture guides serve as nice supplements to the dichotomous keys of Weber and others. It is amazing how much information you can pick up by browsing through the photos and text entries of such guides.

Nature photographer and writer, Don Mammoser of Bailey, Colorado, and naturalist, Stan Tekiela, have teamed up to create a useful, attractive wildflower guide that will be hard to resist for Colorado plant lovers. Published in 2007, the book covers 200 common wildflowers of Colorado. The plants are grouped by flower color. Within the color groups, the plants are arranged by flower size (or flower cluster size), from smallest to largest.

The thick, little paperback book is 6" x 4 ¼" and is close to ¾" wide, which makes it a handy size to stick in a pack or large pocket. An unusual feature of this guide is that each photo in the book is 6" x 4 ½", a godsend for anyone over the age of 40. The photos are of excellent quality and the color is good. The photos are large enough to enable the reader to see both the flowers and leaves. The book focuses on herbaceous plants; very few plants with woody stems are included.

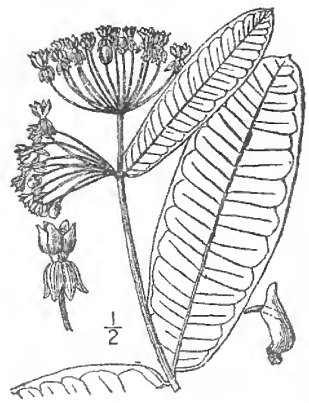
The two-page entries include a large photograph on one page with text about the plant on the facing page. The entry begins with a common name followed by a scientific name of the species. Also included are the common and scientific family names, height, description of the flowers and leaves, bloom period, habitat, and range. The notes in the book are very entertaining and contain information on topics such as uses and pollinators. Icons at the bottom of each page indicate distinctive diagnostic traits such as flower type, leaf type, leaf attachment (alternate, clasping), and fruit type. These are handy aids for helping the user key in on these traits at a quick glance. A glossary and ruler, with inches and centimeters, are also included.

It was exciting to discover a rayless gumweed, *Grindelia inornata*, pictured in the book. I had never noticed a rayless gumweed on the Front Range but, after seeing it in Mammoser and Tekiela's book, I came across it on hikes at South Table Mountain. It had always been there but was "invisible" to me, unnoticed until I saw it in the *Wildflowers of Colorado Field Guide*.

Like all books, this one has its strengths and its weaknesses. The addition of an index that includes scientific names, not just common names, would greatly improve this book. The authors state that the plants in the book are wildflowers that are common and widespread. I was surprised that *Penstemon secundiflorus* is not included in the book, whereas *Asclepias syriaca* (common milkweed) and *Muscari botryoides* (grape hyacinth) are included. The later two species are not on the distribution map for Colorado in the PLANTS database (plants.usda.gov) and I could not find the species listed in Weber's Colorado Flora Eastern Slope or Western Slope books but, apparently, Mammoser and Tekiela found them in the state. It would have been helpful for the authors to state the source used for the scientific names in the plant entries. It would be useful to include scientific names from Weber in parentheses. A list of references would be an addition to the book that I would value, since I am always curious to learn where the authors found the uses, pollination, historical facts, and other interesting information so I can do further reading.

The book can be purchased by linking from the CONPS online bookstore to amazon.com. When you link from the CONPS website to amazon, CONPS receives a percentage from the sales, which helps support the Society.

Jan Loechell Turner works at Regis University and is the CONPS Research Grants Committee Chair. Jan is also our source for great book reviews.



Asclepias syriaca
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 3: 28.

Branching Out

Leo P. Bruederle

With the snow, comes the reality that many of the characters upon which we rely to identify flowering plants are ephemeral. Yet the identification of these plants in their winter condition can be extremely satisfying, particularly when coupled with other outdoor activities, such as snowshoeing. However, identifying old friends from among the remains of shoots, fruits, and inflorescences knee deep in snow can be tricky. Fortunately, flowering plants having a woody growth form -- shrubs, woody vines, and trees -- provide many hints as to their identity, even without the leaves upon which we so heavily depend during the growing season. Notable among these are characters of the vegetative and floral buds, leaf and stipule scars, protective outgrowths, persistent fruits or leaves, and phyllotaxy, among others.

Derived from the word roots "phyllo" for leaf and "tax" referring to arrangement, phyllotaxy provides one of the most useful characters for the identification of plants, including woody plants. Three basic patterns exist based upon the number of leaves arising at a node: alternate, opposite, and whorled. With alternate phyllotaxy, one leaf arises at each node. In contract, opposite and whorled phyllotaxy are characterized by two and three (or more) leaves at a node, respectively. Few species deviate from these basic patterns, although exceptions do exist. One such exception is Buckthorn (*Rhamnus*), a genus of shrubs with a phyllotaxy that is sometimes described as subopposite, where the leaves appear to be nearly, but not quite opposite. And while leaves may be deciduous, the position of persistent leaf scars, prominent axillary buds, and even branches, provide insight into phyllotaxy, as well.

Many families and genera of woody plants can be recognized in their winter condition by a suite of just a few characters. For example, there are four flowering plant families in Colorado with native representatives that grow as small to large trees and have opposite leaves. These are the Maple Family (Aceraceae), Ash or Olive Family (Oleaceae), Honeysuckle Family (Caprifoliaceae), and Oleaster Family (Eleagnaceae). Certainly it is important to be careful when identifying trees in or near urban areas, as other families, genera, and species may be encountered as plantings, such as Catalpa (*Catalpa speciosa*) in the Bignoniaceae.

With respect to growth form, most of us have little trouble differentiating a shrub from a tree -- it is intuitive. However, intermediate growth forms can prove confusing, particularly in the aforementioned families. For example, Rocky Mountain Maple is described as having a growth form that ranges from that of a large shrub (1.5-2m) to a small tree (6-10m). By definition, shrubs and trees are woody plants with persistent aboveground parts. They differ with respect to height, or stature, and the degree to which branching occurs at base. However, in Colorado many trees have multiple stems, a characteristic that we associate with shrubs, specifically. Furthermore, height varies with environment. Fortunately, most of the excellent keys that are available to us take this variation into consideration.

Although identification to genus and species can be tricky, most representatives of these families possess characters that are idiosyncratic to them. Again, Rocky Mountain Maple (*Acer glabrum*) has young twigs that are red in color and, when persistent, the fruits are easily recognized as pairs of winged samaras (single-seeded achenes) with which so many of us mid-westerners played as children. Box elder (*A. negundo*), on the other hand, is truly arborescent and attains a greater height (up to 20m); our native western variety is described as having green twigs covered with short hairs. Bigtooth maple (*A. grandidentatum*) is native to Colorado, as well, but is restricted in distribution to Montezuma County in the southwestern part of the state.

Acer glabrum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 2: 497.

Like Rocky Mountain Maple, Colorado Ash (*Fraxinus anomala*), Blue Elderberry (*Sambucus coerulea*), and Silverberry (*Shepherdia argentea*) are all opposite-leaved large shrubs or, less commonly, small trees. Colorado Ash, which is found along streams and rimrocks in dry canyons and hillsides of western Colorado (4000-6000ft), attains heights of 2-5m. It, too, is character-

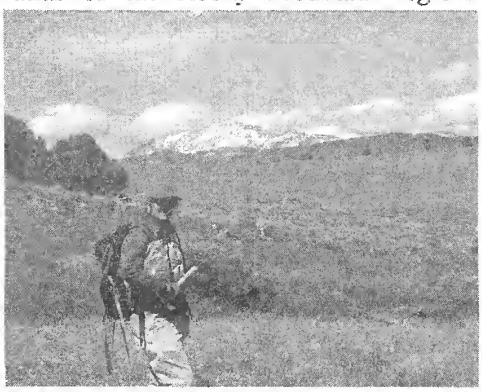
"**Branching Out**" continued on page 14

A Vascular Plant Inventory of the Eastern San Juan Mountains and Vicinity in Southern Colorado

by Jeanette Flaig

The initiation of this project occurred somewhat serendipitously. My husband and I had been residents of California for the prior 2.5 years, and while he was at a job he enjoyed, I was trying to decide what to do with my life. I decided to do what I knew I wanted to do and that was to do a floristic inventory of the Rocky Mountains in Colorado, as this was where I grew up, but I wanted to be in a somewhat remote setting. I contacted Ron Hartman, curator of the Rocky Mountain Herbarium (RM) and made an appointment. He put me in touch with a couple graduate students, one being Melanie Arnett. Melanie mentioned the Eastern San Juan Mountain project, just south of her project as being available. I knew this is where I wanted to be. However, following my meeting with Ron, the project had already been awarded to another potential student. So, I decided not to start school until the following spring (2004), however, as circumstances began to unfold, and untold events occurred, I received a call from Ron in May asking if I wanted THE project. That is the Eastern San Juan project. And if so, could I start the inventories that summer (2003), in June. Wow, that would mean some fast packing and moving, as well as leaving my husband for some time. Well, that is the history, and I am so very thankful for the opportunity I had, to spend two wonderfully fulfilling summers collecting plants in the Eastern San Juan Mountains (ESJ) of Colorado.

The Rocky Mountain Herbarium (RM) has been involved in intensive floristic inventories since 1978. During this time, field work on 49 major projects has been completed. A total of 38 graduate students (contributing roughly 68 percent of the collections), Ron Hartman and Ernie Nelson (contributing roughly 32 percent), and other collectors have amassed 518,292 collections during this period for the RM (Hartman and Nelson 2007). The ESJ is part of a larger effort to map and database the flora of the Southern Rocky Mountains in collaboration with other herbaria on the Front Range, thus creating an electronic atlas of the Rocky Mountain region.



Eastern San Juan Mountains and vicinity: Jeanette Flaig collecting in vicinity of Lone Pine Reservoir. Photo taken in May, 2004.

As I have already stated, this vascular plant inventory took place in southern Colorado, in the Eastern San Juan Mountains (ESJ) and vicinity during the summers of 2003 and 2004. The ESJ area is a large expanse that spans most of the Rio Grande National Forest (RGNF) and the eastern half of the San Juan National Forest (SJNF) comprising roughly 5,000 square miles. Within the circumscription of the project there are three wilderness areas: the Weminuche, the La Garita, and the South San Juan. The ESJ encompasses all or part of eight counties including Saguache, Rio Grande, Conejos, Archuleta, Mineral, Hinsdale, San Juan, and La Plata counties.

The ESJ is a region of high, rugged peaks ranging in elevation from 6,280 ft. in the southwest corner, (Piedra River) to 14,083 ft. atop Eolus Peak. The ESJ form an outlying group in the southern Rocky Mountains, contiguous with mountain ranges from central New Mexico northward through Colorado to southern Wyoming (Atwood and Mather 1932). Four peaks exceeding 14,000 ft, Eolus, North Eolus, Sunlight, and Windom, reside within the San Juan National Forest, and numerous 12,000 and 13,000 ft peaks are found within the area. A diversity of land forms exist, including foothills, mesas, plateaus, buttes, valleys, precipitous canyons, and broad, gently sloping intermontane basins.

As a general rule, topography dictated the method of my collecting. And if you have ever studied a map of the San Juan's you will understand when I say, "due to the significant relief" of the ESJ, I did most of my collecting on foot. Collecting occurred within each habitat type encountered until I had representative specimens of all vascular plants in flower or fruit. Sites that were accessible by vehicle were sampled at 5- to 10-mile intervals and collecting was done at the initial site, and subsequentially at one or more stops to ensure collection of taxa not encountered previously. Using this technique, which is the technique of the RM (Hartman and Nelson 1992, 2005), all vegetation types throughout the area are sampled repeatedly during the growing seasons, however collecting sites are rarely revisited and are spaced to ensure maximum coverage of the project area.

I collected on habitat types that I encountered during each season, however the collecting of alpine plants was considered to be of utmost importance during my second

year in the field. This effort was precipitated by an article by Krajick (2004) on the effects of global change and its effects on plant life. Thus, we felt there was a need for increased base-line data from the alpine. Consequently, I expended extra effort in climbing to alpine areas and peaks where feasible during my second season. In the beginning of the second season, when snow prevented me from venturing into high places, I spent additional sampling time on the forest periphery and public lands (BLM). Ernie Nelson and Ron Hartman also spent considerable time at lower elevations throughout the growing season.

An important aspect of this project was to document plant species of conservation concern. A total of seven candidate species, and 37 species of global and state status were documented from 116 study sites. Thirteen of these sensitive taxa are also endemics. Below is a list of the 7 candidate species and where they were found.

Astragalus brandegeei (Brandegee milkvetch) was collected in a pinyon pine woodland with scattered ponderosa pine at an elevation of 8,791 ft. It has been documented in four Colorado counties: Conejos, Fremont, Gunnison, and Mineral (CNHP 1999). This specimen was found in Saguache County on the East Slope of the Continental Divide (CD). *Astragalus brandegeei* also occurs in Arizona, New Mexico, and Utah, (CNHP 1999).

Astragalus proximus (Aztec milkvetch) was found in shale and sandstone outcrops within a ponderosa pine forest with *Quercus gambelii* and *Fendlera rupicola* understory between 6,430-6,900 ft.. This species was collected on the West Slope of the CD and has been found to occur in both Archuleta and La Plata counties of Colorado (CNHP 1999). Documented occurrences are also found in New Mexico (CNHP 1999).

Astragalus ripleyi (Ripley milkvetch) was collected at three different localities on the East Slope of the CD. The habitats of these occurrences include a grassland and shrubland community, a rocky slope adjacent to a conifer forest and grassland community, and a mixed conifer forest. Elevation ranges were between 8,467 to 9,800 ft. The only previously documented occurrence in Colorado was from Conejos County, however it also has been found in New Mexico (CNHP 1999).

Cleome multicaulis (Slender spiderflower) was found on the East Slope of the CD and occurs in saline or alkaline soils between 7,500-8,000 ft. This specimen was collected around an oasis on private property where the water is captured in a pool and two ponds. Documented occurrences of this plant are Alamosa, Costilla, Rio Grande, and Saguache counties (CNHP 1999). *Cleome multicaulis* also occurs in Arizona, New Mexico, Texas, Wyoming, and Mexico (CNHP 1999).

Draba smithii (Smith whitlow-grass) is a Colorado endemic. Four collections were made on the East Slope of the CD between 9,729-11,805 ft. Habitat sites include a dry and slightly shaded aspen forest, a heavily grazed spruce forest, an alpine fellfield, and a logged forest. Documented occurrences of this plant are Custer, Las Animas, Mineral and Saguache counties (CNHP 1999).

Eastern San Juan Mountains and vicinity: South San Juan Wilderness atop Conejos Peak. Photo taken in June, 2004.

Machaeranthera coloradoensis (Colorado tansy-aster) was collected on the East Slope of the CD between 9,818-12,600 ft.. These specimens were found on shallow soils near rock outcrops or on gravelly slopes and open areas. Documented county occurrences in Colorado are Gunnison, Hinsdale, La Plata, Lake, Mineral, Park, Pitkin, Saguache, and San Juan (CNHP 1999). Additional collections during this inventory were made in Rio Grande County. *Machaeranthera coloradoensis* is also documented in South Central Wyoming (CNHP 1999).

Neoparrya lithophila (Rock-loving Aletes) was a Colorado endemic occurring on the East Slope of the CD until 2006. Collections were documented on rocky north and west exposures in rock-outcrops within and around pinyon-pine woodlands ranging between 7,869 -9,328 ft.. One collection was found in a very shaded area of a rock-outcrop within a pocket of ponderosa pine. County occurrences are Chaffee, Conejos, Fremont, Huerfano, Rio Grande, and Saguache (CNHP 1999). One collection during this inventory was also made in Mineral County. As of 2006, *Neoparrya lithophila* is no longer endemic to Colorado (Hartman et al 2006).

Additionally during this inventory, 18 noxious weeds were documented. In the Colorado Noxious Weed Act (1996), noxious weeds are defined as "plant species that are not indigenous (non-native) to Colorado and meet one of several criteria regarding their negative impacts upo crops, native plant communities, livestock, and the management of natural or agricultural systems." *Hieracium aurantiacum* is the only species detected that occurs on the A list. Of the remaining 17 species, 12 are on the B list and 5 are on the C list.

"**Plant Inventory**" continues on page 12

"**Plant Inventory**" continued from page 11

As a result of this inventory a total of 11,019 specimens of vascular plants were collected for the Rio Grande and San Juan National forests and vicinity during 2003 and 2004. Of these, a total of 1,074 are unique taxa. This inventory vouchered 46 sensitive species, 18 Colorado endemics, 114 non-native taxa, 18 noxious weeds, and 8 hybrid taxa. The total number of collections for the Rio Grande National Forest was 8,182; for the San Juan, 3,223.

Many thanks go to the Rio Grande National Forest (RGNF) and the San Juan National Forest (SJNF) for their monetary contribution. Additional funding for this project was provided by the Aven Nelson Fellowship in Systematic Botany at the University of Wyoming, and the John Marr Fund and the Myrna P. Steinkamp Memorial Fund; the latter two awards both granted from the Colorado Native Plant Society. I am deeply grateful to all my contributors.

REFERENCES CITED

Atwood, W. W. and K. F. Mather. 1932. Physiography and Quaternary Geology of the San Juan Mountains, Colorado. U. S. Dept. Interior. Professional Paper 166. U. S. Govt. Printing Office, Washington.

Colorado Natural Heritage Program. List of Imperiled Species by County and Statewide Species and Natural Community Tracking List. http://www.cnhp.colostate.edu/

Hartman, R. L. and B. E. Nelson. 2007. Rocky Mountain Herbarium. Univ. of Wyoming, Laramie.

Hartman, R. L., B. E. Nelson, B. Reif, and B. Jacobs. 2006. New Vascular Plant Records for New Mexico. *Sida* 22: 1225-1233.

Hartman, R. L. and B. E. Nelson. 2005. General Information for Floristics Proposals. Univ. of Wyoming, Laramie. http://www.rmh.uwyo.edu/

Hartman, R. L. 1992. The Rocky Mountain Herbarium, associated floristic inventory, and the Flora of the Rocky Mountains Project. *J. Idaho Acad. Sci.* 28:22-43.

Krajick, D. 2004. Climate change: all downhill from here? *Science* 303:1600-1602.

Jeanette Flaig is working on her masters in botany at the University of Wyoming.

Book Mail Order Form is now available on-line at http://www.conps.org/bookstore.html. Products listed can only be purchased by members; the form is on-line for our members' convenience.

Request for Proposals

The John W. Marr and Myrna P. Steinkamp Funds

by Jan Loechell Turner

The Colorado Native Plant Society supports research projects in plant biology from the John W. Marr and Myrna P. Steinkamp funds. These separate funds honor the late Dr. John Marr, Professor at the University of Colorado and the first President of the CONPS, and Dr. Myrna Steinkamp, a founding member of CONPS who worked on behalf of the Society for many years in a variety of capacities. Both funds were established to support research on the biology and natural history of Colorado native plants by means of small grants. The Steinkamp Fund targets rare species and those of conservation concern. Both field and laboratory studies are eligible for funding. Thanks to the generous contributions of many members and supporters, a total of nearly $3,000 is available. Individual awards are not likely to exceed $1,000. Recipients of the awards must agree to summarize their studies for publication in Aquilegia and are highly encouraged to present the results of their research in poster or presentation format at the CoNPS annual meeting and/or a chapter meeting.

CoNPS grants have funded a variety of research projects dealing with Colorado native plants. One of the projects resulted in an article on pollinator shifts and length of nectar spurs in columbine flowers, which was published in the journal, Nature (June 2007).

Some examples of research funded by CoNPS grants include:

- Population genetics and hybridization in the rare Colorado endemic *Physaria bellii*
- Pollination studies of *Penstemon degeneri* and *Epipactis gigantea*
- Biogeography and phylogenetics of the *Pyrola picta* species complex
- Prairie dogs and harvester ants as disturbance agents on the shortgrass steppe
- Soil nutrient heterogeneity and vegetative community composition in wind-disturbed and salvage-logged subalpine forests of Routt County
- Chemotype composition of populations of *Monarda fistulosa*

The Board of Directors is now soliciting proposals for a February 15, 2008 deadline. Information on guidelines and requirements for proposals may be obtained by contacting Board member Jan Loechell Turner at jlturner@regis.edu or (303) 458-4262. Alternately, you may visit our web site at http://www.conps.org/research_grants.html.

Announcements

WORKSHOP UPDATES

Nearly all of the workshops are full at this time. If you are interested in trying to register for a workshop in the 2007/2008 season, please contact Mary Ellen Ford at Fordmaryel@aol.com to make sure there is room available before you mail in your registration form and check. Although email is much more preferable, if you do not use email, you can telephone her at her office (303-449-7334). The workshop webpage is updated on a timely basis to provide members with information regarding the status of the workshops, so please check that prior to contacting Mary Ellen.

Plants of the Four Corners Workshop will be held on Saturday, December 1, 2007, ONLY. The Sunday session is canceled.

DENVER CHAPTER

All meetings are on Tuesdays at 7 pm in the Waring house of DBG unless otherwise noted.

Colorado Natural Areas Program

December 11 Brian Kurzel, CNAP

Brian will discuss Colo Natural Areas Program's efforts to conserve rare wildflowers.

Pollination and Breeding System Biology for the rare Colorado endemic, *Penstemon degeneri.*

January 22 Carol English, graduate student at UCD

Carol will share results regarding the flower's breeding system and pollination biology and the adventures of 7 weeks of camping next to this rare Colorado endemic.

Colorado Native Plant Master Program

February 26 Barbara Fahey, Extension Agent CSU JeffCo

Barbara is founder of the Colorado Native Plant Master Program. She will explain what the program is all about while visiting significant native species.

Successes and Challenges of High Altitude Habitat Revegetation in Colorado.

March 25 Robin F Bay, Envir. Scientist, Management, Inc.

Colorado's alpine and subalpine areas receive a variety of disturbances such as mining and recreational use. The short growing season and harsh climate in these areas present unique challenges to revegetation efforts. Robin will tell us about these challenges and the potentials for great success... with time.

The Botanical Peaks.

April 22 Judy Edgar, Mt Goliath Guide and DBG volunteer

Every summer hundreds of people scramble up the peaks of Colorado. For most, the goal is to reach the summit and little thought is given to where the name of the peak came from. Come and learn about the early botanists who left their mark on Colorado. On the way up the mountains you will learn about these 19th century botanists and meet many Colorado wildflowers.

Chapter Field Trip, TBA

May 27

It's the end of May. Who wants to stay inside and talk about native plants when we can visit them? We would like to organize an early evening wildflower walk at a natural area close to the metropolitan area. We would need to meet at the chosen trail head by 6:30 pm in order to get time for a 2 hour walk. Megan and I want to know where you want to go, and if you would like to lead the hike. Send your suggestions to Vickey at vickey4comps@hotmail.com.

NORTHER COLORADO CHAPTER

Northern Colorado chapter meetings are held at 7 pm, first Wednesday of the month (Oct - April), at the Gardens on Spring Creek, 2145 Centre Ave., Fort Collins. Dinner with the speaker will be at Avogadro's at 5:15 pm. If you able to join us please contact Denise Culver at Denise.Culver@lamar.colostate.edu 491-2998 or Phil Phelan 219-6356 pgphelan@yahoo.com.

Biodiversity of a Great Lakes Coastal Forest.

December 5 Pam Smith, Botanist

Pam Smith conducted a vascular plant study and forest composition analysis of a Great Lakes coastal forest located at a small state park in Michigan, as a master's thesis project (2004-2006). Over 700 vascular plant taxa (10 listed species), four uncommon plant communities, as well as rare animals/insects can be found in this area encompassing less than 2000 acres. Her presentation looks at her research results and explores the reasons for the biodiversity of this little-known hotspot."

Welcome New Members

Christina Alba
Vince Aquino
Cindy Beaver & Bill Sitkin
Lynn Boyer
Waldi & Harley Browning
Ann Bunting
Tom Burrows
Jan Chu
David Cole
Gillian Collins
Trista Crook
Deborah & Jack Darnell
Debbie Devereaux
Julie Crawford & Jim Dryer
George Emmons
Eric Fairlee
Audrey Godell
Kathryn Godfrey
Madeline T. Goldhawk
Sharon Heit
Jeanne Hendry
Karen Hollweg
Nuhwuhn & Laurie Jimenez
Joel Kaplan
Anne & Donald Burke
Melissa Lester
Leslie C. Lewis
Tom & Gail Madden
Ernie Marx
Bruce Massey
Kathryn Mauz
Bill May
Margaret-Ann Mayer
Thomas McMurray
Jeff Mitton
Susan Narduzzi
Tina Naugle
Jerry & Mary Persall
Nancy Prieve
Carolina Quintero
Joel Reich
Susan Ross
Richard Ruble
Pam Sherman
Linda Spade
Lynne Sullivan
Carmin Teeple
Stephany Verea
Susan Wallace
Susan Whitehead
Ron Wittmann

"Branching Out" cont. from page 9

-ized by winged, often persistent samaras that occur singly, rather than in pairs, as in maples. Twigs are often four-angled, while the bark is described as being dark and thin, with scaly ridges. Blue Elderberry, also known as New Mexico Elder, can be recognized by its flat-topped inflorescence, which is often persistent, and prominent white, spongy pith; the latter is best viewed by preparing a lengthwise section through an older twig or young branch. Blue Elderberry is found along streams, in valleys, and the bases of cliffs in western Colorado (5500-8000ft), where it attains heights of 2-6m. Finally, Silverberry has twigs that are silver scurfy, when young, while branches are often armed with thorns. It is common in meadows and riverbottoms in western and north central Colorado (4500-7500ft), where it attains heights of 2-7m.

The utility of armature for identification, including thorns, spines, and prickles, will be discussed in the next issue of *Aquilegia*.

References:

Carter, J.L. 2006. Trees & Shrubs of Colorado. Mimbres Publishing, Silver City.

Weber, W.A., and R.C. Wittmann. 2001. Colorado Flora: Eastern Slope. University Press of Colorado, Boulder.

Weber, W.A., and R.C. Wittmann. 2001. Colorado Flora: Western Slope. University Press of Colorado, Boulder.

Leo P. Bruederle is a Director on the Board of CONPS. He is also Chair of the Department of Biology at University of Colorado Denver, where he can be contacted at leo.bruederle@cudenver.edu.

Aquilegia CONPS Newsletter

Aquilegia is published four or more times per year by the Colorado Native Plant Society. This newsletter is available to members of the Society and to others with an interest in native plants. Articles for *Aquilegia* may be used by other native plant societies or non-profit groups, if fully cited to author and attributed to *Aquilegia.*

Articles from 500 to 1500 words in length, such as unusual information about a plant, are welcome. Previously published articles submitted for reprinting require permission. Digital photographs or line drawings are also solicited. Please include author's name and address, although anonymity may be requested. Articles must be submitted electronically.

Please direct all contributions to the newsletter to:

Kim Regier
kimberly.regier@cudenver.edu
PO Box 200
Ft. Collins, CO 80522

Colorado Native Plant Society

The Colorado Native Plant Society is a non-profit organization dedicated to the appreciation and conservation of the Colorado native flora. Membership is open to all with an interest in our native plants, and is composed of palnt enthusiasts both professional and non-professional.

Please join us in helping to encourage interest in enjoying and protecting Colorado's native plants. The Society sponsors field trips, workshops, and other activities through local chapters and statewide. Contact the Society, a chpater representative, or committee chair for more information.

MEMBERSHIP APPLICATION AND RENEWAL FORM

Name(s) _____

Address _____

City _____ State _____ Zip _____

Phone _____ E-mail _____

Chapter (Circle one): Boulder Northern CO Metro Denver Plateau SE SW San Luis Valley

DONATION

$_____ General Fund

Endowments in support of small grants-in-aid of research:

$_____ John Marr Fund: research on the biology and natural history of Colorado native plants.

$_____ Myrna P. Steinkamp Memorial Fund: research and other activities that will benefit the rare plants of Colorado.

CONPS IS A NON-PROFIT ORGANIZATION DUES AND CONTRIBUTIONS ARE TAX-DEDUCTIBLE

Mail to: Eric Lane, PO Box 200, Ft. Collins, CO 80522

MEMBERSHIP CLASS

Dues cover a 12-month period

___ Individual, $15.00
___ Family/dual, $20.00
___ Senior, $8.00
___ Student, $8.00
___ Corporate, $30.00
___ Supporting, $50.00
___ Lifetime, $250.00

CALENDAR 2006 - 2007

WORKSHOPS

December 1	Plants of the Four Corners
January 12&13	Intro to Asteraceae
February 9&10	Mints of Colorado
April 12&13	Penstemon
May 3&4	Plant Terminology
June 27,28,29	Carex

CHAPTER PROGRAMS

BOULDER CHAPTER

December 13	America's Lost Landscape
January 10	Adapting Native Plants for the Garden Home
February 14	No meeting
March 13	Ten Years of Restoring Boulder's Wildlands
April 10	TBA
May 8	Native Plant Hike and Picnic

NORTHERN COLORADO CHAPTER

December 5	Great Lakes Coastal Forest

METRO-DENVER CHAPTER

December 11	CNA P Efforts to Conserve Rare Plants
January 22	*Penstemon degneri*
February 26	Colorado Native Plant Master Program
March 25	High Altitude Habitat Revegetation
April 22	Botanical Peaks
May 27	Chapter Field Trip

FIELD TRIPS

January 12	Winter Botany

BOARD MEETINGS

February 9
April 12

See http://www.conps.org/conps.html for details.

TIME SENSITIVE MATERIAL

Colorado Native Plant Society
P.O. Box 200
Fort Collins, Colorado 80522
http://www.conps.org